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COVER STORY

Osteoarthritis
& Rheumatoid Arthritis

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There are many studies confirming the excellent effect and safety of glucosamine sulfate. In one well designed study of 178 patients suffering from osteoarthritis of the knee (Qiu GX et al., 1998), one group was treated for 4 weeks with glucosamine sulfate 1500 mg daily and the other group with ibuprofen at 1200 mg per day. Glucosamine relieved the symptoms as effectively as ibuprofen, and was significantly better tolerated than ibuprofen. The safety and tolerability of glucosamine can easily be explained by the fact that it is a physiological substance normally used by the body.

As with most natural remedies the therapeutic effect of glucosamine does not come immediately, and usually takes some weeks to appear (1-8 weeks). Once achieved, it tends to persist for a notable time even after discontinuation of the treatment.

A Healthy Joint

To understand the pathological processes in the joint, we need to take a look at the normal healthy joint. Joints are held together by a joint capsule and designed to allow smooth movement between adjacent bones. In the type of joint commonly affected by arthritic diseases, the highly movable joints, we find the bone ends covered by articular cartilage and the joint space enclosed by a synovial membrane. This thin membrane secretes synovial fluid that lubricates the space between the cartilage-covered joint-forming bones. The cartilage contains no blood vessels or nerves and receives its nutrients by diffusion from the synovial fluid and from the bone.

Joint function depends on the health of the cartilage in the joint. Cartilage is a gel-like substance that acts as a shock absorber, essential for smooth and easy movement in the joint. Cartilage gets its elasticity from collagen fibers and its sponge-like quality from water, held by a structure of big molecules called proteoglycans. Collagen and proteoglycans are produced by special cells, called chondrocytes, in the cartilage. Joints can withstand enormous pressure by slowly releasing water from the cartilage.

As we age the ability to restore and maintain a normal cartilage structure begins to decline. The activity of important repair zymes is reduced, the water content diminished, and the joints become more prone to damage. But the full pathological mechanism for development of arthritis is not yet known.

Chondroitin sulfate
Chondroitin sulfate is a major component of cartilage. It is a very large molecule, composed of repeated its of glucosamine sulfate. Like glucosamine, chondroitin sulphate attracts water into the cartilage matrix and stimulates the production of cartilage. Likewise it has the ability to prevent enzymes from dissolving cartilage. Although the absorption of chondroitin sulfate is much lower than that of glucosamine (10-15% versus 90-98%), a few recent studies have shown very good results from long-term treatment with chondroitin sulfate, reducing pain and increasing range of motion.

- A one-year long, double blind clinical study including 42 patients with osteoarthritis showed that chondroitin sulfate was well tolerated and significantly reduced pain and increased joint mobility. The patients were given 800 mg chondroitin sulphate per day or placebo (Uebelhart D et al., 1998).

- In another double-blind study 119 patients with finger-joint osteoarthritis were followed for 3 years. The chondroitin dosage was 400 mg three times daily. X-rays of the finger joints were carried out at the start and at yearly intervals. The number of patients that developed progression of the disease was significantly less in the group treated with chondroitin sulfate (Verbruggen G et al., 1998).

- The improvement in walking time was studied in 80 patients with osteoarthritis in the knee. In this double-blind study the treatment period was 6 months and the chondroitin sulfate dosage 400 mg twice daily. The minimum time to perform a 20 meter walk showed a constant reduction of time only in the chondroitin group. Lower consumption of pain-killing drugs and excellent tolerability was also observed (Bucsi et al., 1998).

Glucosamine alone or in combination with chondroitin sulfate is more and more becoming recognized as the treatment of choice for osteoarthritis even in the United States. Its ability to actually repair and improve joint function in addition to providing pain relief gives it a significant advantage compared to conventional treatment.

Willow bark

Salicylic acid, the basis of aspirin, was first prepared from willow bark by an Italian chemist in 1838. The name of the compound is derived from Salix, the Latin name for the willow genus. Aspirin, or acetylsalicylic acid, is a synthetic form of salicylic acid. Willow bark is rich in salicin and related salicylates that metabolize into salicylic acid. Many plants, such as meadowsweet and wintergreen, also contain these compounds. They have a long tradition of use in Europe, and far fewer side effects than aspirin.

While aspirin/salicin has been shown to have a lowering effect on some of the pro-inflammatory factors, it can also increase ukotriene LTB4, which is a major inflammation promoting mediator. An interesting study (Engstrom K et al., 1997) compared the effect on pro-inflammatory substances of aspirin alone with a combination of low-dose aspirin and fish oil. The results showed that the combination of fish oil and low-dose aspirin has significantly more favorable effects on the pattern of pro-and anti-inflammatory factors than the aspirin alone. LTB4 increased 19% when aspirin was taken by itself, but decreased 69% after intake of aspirin and fish oil together.

Current Medical Treatment

The basic conventional treatment for both osteoarthritis and rheumatoid arthritis consists of NSAIDs including aspirin. Even stronger drugs such as corticosteroids, gold salts and methotrexate are often prescribed for RA in an aggressive attempt to stop the development of the disease. These drugs are all aimed at alleviating pain and reducing inflammation. They can sometimes be effective, but more often, however, they prove unsatisfactory and many times intolerable due to toxicity. Aspirin, for example, which is the most commonly used, is quite effective, but it often causes gastric irritation and tinnitus (ringing in the ears) with the high dosages needed. Other NSAIDs may be somewhat better tolerated but have an even greater risk for serious side effects, which limits their use. These treatments are only symptomatic, because they do not act on the causes of arthritis and do not stop the progression of the disease. In fact, the opposite has proven to be true. It has been demonstrated in many studies that NSAIDs actually have an inhibitory effect on cartilage repair and accelerate cartilage destruction (Brooks PM et al., 1982; Shield MJ, 1993; Newman NM et al., 1985; Solomon L, 1973; Ronningen H et al., 1979). How can it be that NSAIDs help and destroy at the same time?

NSAIDs exert their analgesic and anti-inflammatory effects through the inhibition of the enzyme cyclooxygenase (COX). The discovery (Needleman P et al., 1979) that two forms of COX exist, COX-1 and COX-2, has clarified the dual nature of NSAIDs. While relieving pain and inflammation through COX-2 blockade, they also block, via COX-1, the biotransformation of arachidonic acid to substances that carry out various homeostatic (balancing) physiological functions, one of which is to protect the gastrointestinal mucosa and limit gastric acid output. While NSAIDs inhibit prostaglandin and leukotriene synthesis through COX-2 blockade, they fail to influence the TNF-a and IL-1b activation of cartilage destroying enzymes.

With this enhanced understanding of the underlying mechanisms for current medical treatment, researchers are now looking for new compounds that will relieve pain and inflammation and enhance the repair process in the joints, without inhibiting important physiological functions. A COX-2 -specific inhibitor has recently come out on the pharmaceutical market and other products are underway.

Fish oil

It is established that dietary fatty acids determine the composition of lipids in the cell membranes, which influences the production of prostaglandins and leukotrienes that regulate inflammation, a fact that has given rise to interest in the potential of these dietary substances.

Omega-3-oils, such as fish oil (EPA and DHA) and flax seed oil, have the ability to suppress the production of inflammatory mediators and thereby influence the course of chronic inflammatory diseases such as RA. (Kremer JM et al. 1985 and 1992).

A new enteric-coated fish-oil preparation was used in a one-year, double blind study of 78 patients with inflammatory bowel disease. The absorption rate and tolerability was high with this preparation, and after one year 59% of the fish-oil group remained in remission compared to 36% in the placebo group, indicating a significant anti-inflammatory effect (Belluzzi A et al., 1996)

In recent studies, dietary omega-3 oils have shown a suppressive effect on the production of the cytokines IL-1b and TNF-a, which stimulate the production of collagenase and pro-inflammatory prostaglandins (PGE2) (James MJ et al., 1997; Caugey GE et al., 1996). When fish oil supplementation was given to rheumatoid arthritis patients, arachidonic acid levels were reduced by 33% compared to presupplement values (Sperling RI et al., 1987), suggesting that increase of dietary omega-3 oils can be complementary in treating rheumatoid arthritis.

A large number of publications from around the world have confirmed the usefulness of dietary supplementation with omega-3 oils in relieving tender joints and morning stiffness in patients with RA, in some cases eliminating the need for NSAID medication (Kremer JM et al., 1995). Skoldstam et al. (1992) and Lau et al. (1993) found that patients consuming fish oil were able to significantly reduce their NSAID dose compared with a control group.

Of 12 published double blind and placebo-controlled studies with a duration of 12-52 weeks, decreased joint tenderness was the most common favorable outcome reported. Fish oil supplementation significantly decreased the use of NSAIDs in the three studies in which NSAIDs were used. Unlike NSAID use, fish oil consumption is not associated with gastrointestinal toxicity. The results of the studies suggest that the effective dose of fish oil is approximately 3-6 grams per day. Higher dosages did not give better results. There are indications that the combination of EPA and DHA, as it is found in fish oil, has a synergistic effect (Robinson DR et al., 1989).

A study by James MJ et al. (1997) emphasizes the potential for increased efficacy of anti-inflammatory drugs, when using omega-3 oils in the diet. It was observed that diets rich in omega-3 oils and low in omega-6 fats had a drug sparing effect with decreased side effects. Drug toxicity is estimated to contribute 60% of the total cost of treating RA patients in the United States (Prashker MJ et al., 1995). Use of omega3-oils in the diet would appear to offer a simple, safe and inexpensive way to reduce toxicity and side effects from RA medications.

Oxidative damage

Food is not conventionally accepted as influential in the course of inflammatory or degenerative diseases (in contrast to diabetes and vascular heart disease).

We know, however, that oxidative stress or free radical damage is a factor of importance in the development of osteoarthritis, just as it is a major cause of most chronic degenerative diseases as well as aging. There is also strong evidence that oxidative damage occurs in RA patients. Increased oxidation of lipids (peroxidation) as well as depletion of ascorbate in serum and synovial fluid has been observed. High doses of vitamin E, which is a powerful antioxidant, are reported to diminish pain. Most importantly, tumor necrosis factor alpha (TNF-a), which plays a key role in RA, is well-known to cause oxidative stress.

In order to counteract free radical damage, antioxidants are needed. A diet rich in vegetables and fruits is likely to add important antioxidants to the body. This may not always be enough, however. Vitamin C and vitamin E supplements have been studied and found to be important in the treatment of osteoarthritis. Deficient vitamin C intake, which is common with elderly people, impairs the synthesis of collagen, the main protein of cartilage (Bates CJ, 1977). Studies on vitamin E have shown its ability to stimulate the production of cartilage components, such as glycosaminoglycans, as well as to inhibit the breakdown of cartilage.

Healthy food and a minimum of toxins may be more important for our health than we want to believe. The body strives to heal itself, whether it is a cut finger, a cold or a damaged or inflamed joint. It makes sense to find ways to support the body with natural

substances that the body can use in the healing process.

Recent research has provided us with new insights into the mechanisms of arthritis, and left us with a scientific understanding of how natural remedies work in harmony with the body rather than against it.

Product Information:
ArthroPro System
For Joint Health & Comfort

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